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the knapra BEEBLE



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ENTOMOLOGICAL SECTION
FEDERAL GOVERNMENT

A PEST of
STORED GRAINS
and CEREAL
PRODUCTS

the khapra BEEBLE



A PEST of STORED GRAINS and CEREAL PRODUCTS

The khapra beetle has been successfully eradicated in the United States, and it is important that this country remain free of the pest.

The khapra beetle seriously damages stored cereal products and feeds on whole kernels of stored cereal grains—wheat, corn, barley, oats, rye, and rice. It also attacks stored seed, cottonseed meal, nut meats, dried fruits, and other products of plant or animal origin.

This insect pest causes severe losses of infested products. Total loss can be expected when infested grain is left undisturbed in storage for long periods.

Many times each year the khapra beetle is intercepted in foreign cargo shipped to the United States. If reintroduced, the insect could become a threat to billions of bushels of important products stored in the United States.



ORIGIN AND SPREAD

The khapra beetle, first described in 1898, is a native of India, Ceylon, and Malaya. It now occurs in Great Britain, Japan, the Philippines, and numerous countries of Europe, Asia, and Africa. While it is believed this pest may have been in the United States as early as 1939, it was not until 1953 that it was discovered in California. Subsequently, the khapra beetle was found in Arizona, New Mexico, Texas, and the Republic of Mexico. Infested properties were immediately scheduled for fumigation when they were found.

ERADICATION PROGRAM

A continual, cooperative program of eradication was carried out by the U.S. Department of Agriculture, the affected States, and Mexico. New infestations were treated as soon as possible after they were discovered.

Early Detection

To keep the United States free of this pest, infestations must be located at an early stage. Then, eradication measures can be started in time to prevent serious damage and stop spread of the pest to new localities.

The khapra beetle is difficult to detect because of its size—it is only about $\frac{1}{8}$ inch long. Detection surveys are made repeatedly by State and Federal entomologists in principal storage areas throughout the United States and Mexico. But these surveys are not adequate to prevent reintroduction of the pest. Help is needed from all handlers of stored products—farmers; operators of grain, feed, and seed houses; trucking and railway companies; and food storage concerns. They should report any suspected khapra beetle infestations.

Quarantine

Whenever an infestation is found, the site is placed under regulation; cooperative eradication measures are begun. To meet the requirements of the quarantine regulations, stored products and all articles exposed to the



Khapra beetle larvae in lima beans.

khapra beetle must be treated and certified free of infestation before they may be moved from an infested site. Eradication procedures are carried out by private fumigation operators under contract to, and under supervision of, State or Federal agencies.

Ports of entry. — Domestic freight traffic is increasing and ocean-going cargo ships are plying the St. Lawrence Seaway. Because of this, inspections have been intensified to prevent the khapra beetle from reaching vital midwest storage facilities. Inspections have been numerous and Federal quarantine inspectors are constantly on the alert to detect the presence of the khapra beetle at ports of entry.





Grain elevator encased in plastic-coated nylon tarpaulins during fumigation to kill khapra beetles.

Eradication Treatment

The khapra beetle cannot be eradicated by using conventional insecticide sprays or the customary dosages of grain-treatment fumigants. Special measures must be employed to destroy the pest. Methyl bromide and hydrogen cyanide gases are effective fumigants when used at concentrations higher than those necessary to kill other grain pests. These high concentrations are applied only under the supervision of trained Federal or State pest control specialists.

HOW YOU CAN HELP

- Watch for this pest; look for it particularly in grain and grain products that have been stored for an extended period.

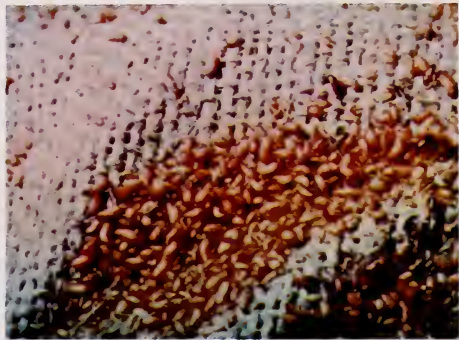
- Examine sacks and other containers to find any infestations. Do this before shipment and before the containers are reused for stored products. Sacks or containers showing presence of stored-product insect pests should be fumigated before reusing.

- Report suspected khapra beetle infestations to State or Federal plant pest control inspectors, or to your county agricultural agent.

- Collect samples of suspected insects, and place them in vials containing rubbing alcohol or grain alcohol. Give the samples to the above-named officials, or mail them to the Plant Protection Division, U.S. Department of Agriculture, Federal Center Building,

Hyattsville, Maryland 20782. *Do not mail live specimens of khapra beetles.* Include your return address with a note stating that the samples are suspected of being khapra beetles.

- Comply with all quarantine regulations. Cooperate with program personnel in eradicating the pest if it is found on your premises.



Khapra beetle larvae on a burlap bag.

DEVELOPMENT AND HABITS

The development of the khapra beetle has four stages—egg, larva, pupa, and adult. The length of the life cycle (egg to adult) varies from 26 days at 93°–95° F. to 220 days at 70°.

Eggs are about $\frac{1}{64}$ inch long, and white.

Larvae are yellowish-white upon hatching; they change to reddish-brown as they shed their skins 2 to 11 times. They are about $\frac{1}{4}$ inch long when full grown.

Pupae are about $\frac{1}{4}$ inch long, and are enclosed in the last larval skin.

Adult males are small, brownish-black beetles, about $\frac{1}{8}$ inch long. Adult females are a little larger, and lighter in color.

Young larvae are unable to feed on whole kernels of grain, and

depend upon damaged kernels or grain products for food. Older larvae can feed on whole grains. The amount of food present is a factor in the speed of their development, but larvae can survive long periods without food. Adults feed very little, if at all.

The khapra beetle feeds only on stored products—never on growing crops. The beetle cannot fly, so its movement is limited. Activity of the insect is generally confined to the top 12 inches of grain, although it has been found as deep as 12 feet, particularly in corners and along walls of bins.

The insects crowd into cracks in masonry, woodwork, and cartons, into creases of sacks, in debris, and in other protected places where they are difficult to find.



All stages of khapra beetle on a corn kernel.



Khapra beetle larvae on a cinder block wall.

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